IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

WSOU INVESTMENTS, LLC D/B/A BRAZOS LICENSING AND DEVELOPMENT,	§	
	§	**CIVIL ACTION 6:20-cv-01163-ADA**
	§	**CIVIL ACTION 6:20-cv-01164-ADA**
Plaintiff,	§	**CIVIL ACTION 6:20-cv-01165-ADA**
	§	**CIVIL ACTION 6:20-cv-01166-ADA**
v.	§	**CIVIL ACTION 6:20-cv-01167-ADA**
	§	**CIVIL ACTION 6:20-cv-01168-ADA**
SALESFORCE.COM, INC.,	§	**CIVIL ACTION 6:20-cv-01169-ADA**
Defendant.	§	**CIVIL ACTION 6:20-cv-01170-ADA**
	§	**CIVIL ACTION 6:20-cv-01171-ADA**
	§	**CIVIL ACTION 6:20-cv-01172-ADA**

DECLARATION OF DR. DOUGLAS C. SCHMIDT IN SUPPORT OF

SALESFORCE'S OPENING CLAIM CONSTRUCTION BRIEF

I, Douglas C. Schmidt, declare as follows:

1. I am qualified and authorized to attest to the matters set forth in this Declaration. I have knowledge of the facts set forth in this Declaration based on my own personal information or investigation into the relevant subject matter.

I. INTRODUCTION

2. I am over the age of 18 and am competent to make this Declaration. I have personal knowledge or have developed knowledge of these technologies based upon education, training, or experience, of the matters set forth herein.

3. I have been retained by counsel for defendant salesforce.com, inc. ("Salesforce") as an expert to provide opinions regarding the understanding of a person of ordinary skill in the art ("POSITA") in connection with certain terms in the claims of U.S. Patent Nos. 8,209,411 (the "'411 patent"), 8,280,928 (the "'928 patent"), 8,335,819 (the "'819 patent"), 8,369,827 (the "'827 patent"), 8,923,899 (the "'899 patent"), and 9,088,493 (the "'493 patent").

4. I am being compensated at my usual hourly rate of $550 per hour. I am also being reimbursed for any out-of-pocket expenses. I have no financial interest in, or affiliation with, Salesforce. My compensation does not depend in any way on the outcome of this case, the substance of my testimony, or opinions that I express.

5. In rendering my opinions, I have considered the patents at issue, their file histories, the parties' claim construction disclosures, and any other documents referenced, discussed, or listed in my declaration, and my own knowledge and experience in the user interface, computer networking, wireless communications, telecommunications networks, relational database management system, data structures, algorithms, and other computing fields relevant to the asserted patents.

6. In forming my opinions, I understand that the claims should be interpreted as they would be understood by a POSITA of the patent at the time its application was filed. I understand that the claims are to be construed with reference to the patent's specification, the claims, the prosecution history, in light of the plain meaning of the terms used in the claims, and with potential reference to other sources of information, such as dictionaries, textbooks, and literature or other patents in the same or related fields.

7. My analysis of the materials produced in this matter is ongoing and I will continue to review any new material as it is provided. This declaration represents only those opinions I have formed to date. I reserve the right to amend or supplement my opinions based on additional documents or evidence I am presented, including without limitation any arguments or expert declarations advanced by either party in this case.

II. QUALIFICATIONS AND EXPERIENCE

8. My Curriculum Vitae, attached as Exhibit A, is a true and accurate listing of my qualifications. I summarize some of these qualifications below.

9. I am currently tenured as the Cornelius Vanderbilt Professor of Engineering with the Department of Electrical Engineering and Computer Science at Vanderbilt University in Nashville, TN, where I also serve as the Associate Provost for Research Development and Technologies and the co-Director of the Data Science Institute. I have been a full-time university professor since 1994, and I was previously a tenured professor at the University of California, Irvine with the Electrical and Computer Engineering department from 2000 to 2003 and Washington University in St. Louis, MO with the Computer Science and Engineering department from 1994 to 2000. In addition, I served as the Chief Technology Officer for the Software Engineering Institute at Carnegie Mellon University from 2010 to 2012.

10. I hold a Doctor of Philosophy (PhD) degree in Computer Science from the University of California (UC) Irvine in Irvine, CA, which I received in 1994. I also earned a Master's Degree in Computer Science from UC Irvine in 1990, as well as a Bachelor's Degree in Sociology in 1986 and Master's Degree in Sociology in 1984 from the College of William and Mary in Williamsburg, VA. Prior to completing my graduate studies at UC Irvine, I worked with the Urban Information Systems ("URBIS") project at UC Irvine's Public Policy Research organization, where I studied end-user computing interactivity with municipal institutions in 40 cities across the United States. I also worked at the International Center for Information Technology ("ICIT") in Washington, D.C. on projects assessing techniques for improving software productivity for enterprise IT systems.

11. I first started programming in 1983 when I was an undergraduate student taking statistics courses at the College of William and Mary in Williamsburg, VA. While I was an undergraduate and graduate student at William and Mary I programmed with the SPSS and SAS statistical packages and worked as a programmer at the National Center for State Courts during the summer of 1986 as I was completing my Master's degree. From 1985 through 1988 I learned how to program in Pascal, C, C++, Ada, Prolog, and Lisp, both at the College of William and Mary (where I was a graduate student in the Sociology department) and at UC Irvine (where I was a graduate student in the Information and Computer Science department). During this time period I also learned how to program networked software services and applications using platforms, libraries, and protocols available at the time, such as UNIX Sockets and TCP/IP. During the time I was also an avid user of popular networked applications, such as remote login (rlogin and TELNET), email, and file transfer (FTP), which provided distributed services for accessing remote computer resources and collaborating over local area and wide area networks.

12. During the past 30 years, I have conducted and supervised a significant number of research projects involving a wide range of software-related topics including patterns, optimization techniques, and empirical analyses of object-oriented middleware frameworks for distributed real-time embedded systems and mobile cloud computing applications, including applications backed by relational database management systems. I have published over 650 scholarly articles and technical papers, and I am the co-author or editor of 12 books or book-length manuscripts on various topics, including software architecture, network programming, object-oriented frameworks, distributed and real-time systems, open-source middleware platforms, and mobile cloud computing applications. My work has been cited more than 44,700 times across a comprehensive spectrum of high-impact publications, and my current h-index score is 87, which indicates the significant impact of my publications on scholarly literature in the field of Computer Science.[1] I have also supervised the research of more than 40 PhD and Master's graduate students to date. In addition to conducting and publishing my own research, I have served on the editorial board of numerous journals, including publications by IEEE and the ACM, and I have been a guest editor of numerous special issue journals based on my research expertise.

13. My research has been funded by a variety of organizations, including both federal agencies, such as DARPA, NSF, NASA, NIH, the U.S. Air Force, and the U.S. Navy, as well as leading companies, such as Northrup Grumman, Raytheon, Lockheed- Martin, Boeing, McDonnell-Douglas, General Electric, and Siemens. I have also received other honors and awards, including election to professional organizations, engagements for invited talks and the

[1] The h-index is a popular measure of scholarly productivity. The definition of the index is that a scholar with an index of h has published h papers each of which has been cited in other papers at least h times. Thus, the h-index reflects both the number of publications and the number of citations per publication.

2015 Award for Excellence in Teaching from the Vanderbilt University Department of Electrical Engineering.

14. In addition to my research experience, I have decades of hands-on programming experience with a variety of different programming languages. I have programmed with object-oriented languages since the mid-1980s when I began to program with C++. I have programmed with Java and other related object-oriented and functional languages (such as C# and Python) since the mid-1990s and early 2000s. While at the University of California Irvine starting in 1991 I led the development of one of the first C++ object-oriented frameworks for concurrent and networked middleware and applications (ACE) and later starting in 1996 developed one of the first Java object-oriented frameworks for concurrent and networked middleware and applications (Java ACE). Since 1990, I have taught more than 1,000 students in dozens of face-to-face courses on network programming to both undergraduate and graduate students at UC Irvine, Washington University St. Louis, and Vanderbilt University. Since 2013, I have taught mobile cloud computing to more than 200,000 students in Massive Open Online Courses (MOOCs) on the Coursera platform, which have focused on technologies like mobile app programming with Android and JavaScript and cloud service programming with various web services frameworks, such as Spring and Node.js. Mobile cloud computing applications commonly connect to relational database management systems to provide access to large data repositories.

15. In addition to my regular course offerings, over the past 30 years I have also taught over 600 short-courses and tutorials on numerous subjects, including: object-oriented and functional design patterns and programming techniques; systems programming and network programming for UNIX and Windows; object-oriented and functional programming languages;

and, various courses on distributed operating systems, web apps and services, mobile cloud computing, compiler construction, algorithms, and data structures.

16. For the past three decades, I have led the development of ACE, Java ACE, TAO, and CIAO.[2] The millions of lines of object-oriented code in these frameworks provide layers of system infrastructure middleware that simplify the development of concurrent and networked software apps and services and often integrate with relational database systems.

17. In addition to my various academic and research engagements, from 2010 to 2014 I served as a member of the United States Air Force Scientific Advisory Board, where I was the Vice Chair of Cyber Situational Awareness, a study for the U.S. Air Force on the network security of mission operations. I also recently served on the Advisory Board for the U.S. Naval Air Systems Command (NavAir) Future Airborne Capability Environment (FACE) and was recently a co-lead of a task force on "Published Open Interfaces and Standards" for the U.S. Navy's Open Systems Architecture initiative.

18. From 2000 to 2003 I served as a Deputy Office Director and Program Manager at the Defense Advanced Research Projects Agency (DARPA), where I led the national research and development effort on portable open system architecture middleware for distributed real-time and embedded (DRE) systems, which focused on the systematic use of adaptation, supported by redundancy, heterogeneity, and use of computer network security mechanisms, such as access-control, intrusion detection and packet filtering.

19. My work on middleware for DRE systems has transitioned to the Joint Tactical Terminal (JTT) and Joint Tactical Radio System (JTRS) software defined radio programs,

[2] *See Obtaining ACE, TAO, CIAO, and DAnCE*, Vanderbilt, http://download.dre.vanderbilt.edu/ (for access to ACE, TAO and CIAO downloads) (attached herein as Exhibit B); *Java ACE*, Vanderbilt, http://www.dre.vanderbilt.edu/JACE/ (for access to Java ACE downloads) (attached herein as Exhibit C).

manned/unmanned combat air vehicles, the Orbital Express low earth orbit (LEO) satellite telemetry and control framework, the Ground Support System (GSS) for the X33 Single Stage To Orbit (SSTO) Reusable Launch Vehicle, and the USS Ronald Reagan and USS Zumwalt, the USAF upgraded early warning radar system, as well as the Facebook iPhone app and electronic medical imaging systems from Siemens and GE, among many other governmental and commercial applications. During 2001 to 2003, I also co-chaired the Software Design and Productivity (SDP) Coordinating Group of the U.S. government's multi-agency Networking and Information Technology Research and Development (NITRD) Program, which helped to formulate a national interagency software research agenda.

20. Additionally, over the last two decades I have been retained as an expert consultant more than two dozen times in a variety of computer software-related matters, focusing primarily on topics related to the software and network infrastructure of mobile and cloud computing platforms.

III. LEGAL STANDARDS

A. Claim Construction

21. I am not a lawyer, and I do not intend to offer any opinions as to the interpretation of the law. However, I have a general understanding of claim construction based on my experience with patents, my work as an expert in other cases, and my conversations with counsel.

22. I am informed that on the law regarding claim construction and patent claims, a patent may include two types of claims, independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend from an independent claim.

23. I am informed that claim construction is a matter of law to be decided by the Court. I understand that claim terms are presumed to have their plain and ordinary meaning, as understood by a POSITA at the time of the invention, in the context of the patent specification, the prosecution history, and any other relevant evidence.

24. I am informed that to determine how a POSITA would understand a claim term, one should look to those sources available that show what a person of skill in the art would have understood the disputed claim language to mean. Such sources include the words of the claims themselves, the remainder of the patent's specification, the prosecution history of the patent and the cited references (all considered "intrinsic" evidence), and "extrinsic" evidence, such as dictionary definitions, learned treatises and the opinions of qualified experts concerning relevant scientific principles, the meaning of technical terms, and the state of the art.

25. I am informed that, in construing a claim term, one looks primarily to the intrinsic patent evidence, including the words of the claims themselves, the remainder of the patent specification, and the prosecution history.

26. I am informed that extrinsic evidence, which is evidence external to the patent and the prosecution history, may also be useful in interpreting patent claims when the intrinsic evidence itself is insufficient.

27. In construing claims, the claims themselves, the patent specification, and the prosecution history are of paramount importance. Additionally, the specification and prosecution history must be consulted to confirm whether the patentee has acted as its own lexicographer (i.e., provided its own special meaning to any disputed terms), or intentionally disclaimed, disavowed, or surrendered any claim scope.

28. I understand that the claims of a patent define the scope of the rights conferred by the patent. The claims must particularly point out and distinctly claim the subject matter which the patentee regards as his invention. Because the patentee is required to define precisely what he claims his invention to be, it is improper to construe claims in a manner different from the plain import of the terms used consistent with the specification. Accordingly, a claim construction analysis must begin and remain centered on the claim language itself. Additionally, the context in which a term is used in the asserted claim can be highly instructive. Likewise, other claims of the patent in question, both asserted and unasserted, can inform the meaning of a claim term. For example, because claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims. Differences among claims can also be a useful guide in understanding the meaning of particular claim terms.

29. I understand that a POSITA is deemed to read a claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification. For this reason, the words of the claim must be interpreted in view of the entire specification. The specification is the primary basis for construing the claims and provides a safeguard such that correct constructions closely align with the specification. Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelope with the claim as set forth in the patent itself.

30. I understand that while intrinsic evidence is of primary importance, extrinsic evidence, *e.g.*, all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises, can also be considered. For example,

technical dictionaries may help one better understand the underlying technology and the way in which one of skill in the art might use the claim terms. Extrinsic evidence should not be considered, however, divorced from the context of the intrinsic evidence. Evidence beyond the patent specification, prosecution history, and other claims in the patent should not be relied upon unless the claim language is ambiguous in light of these intrinsic sources. Moreover, while extrinsic evidence can shed useful light on the relevant art, it is less significant than the intrinsic record in determining the legally operative meaning of the claim language.

B. Indefiniteness

31. I understand that a patent must satisfy a definiteness requirement, which requires that it conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as the invention.

32. Iunderstand that a patent must be precise enough to afford clear notice of what is claimed and apprise the public of what is still open to them in a manner that avoids a zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims.

33. I understand that definiteness requires that a patent's claims, viewed in light of the specification and file history from the perspective of a person skilled in the relevant art, inform those skilled in the art about the scope of the invention with reasonable certainty.

34. I understand that a patent must be precise enough to afford clear notice of what is claimed and apprise the public of what is still open to them in a manner that avoids a zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims.

35. I understand that patents are presumed valid and indefiniteness is an invalidity defense. So, I understand that indefiniteness must be shown by clear and convincing evidence.

IV. LEVEL OF ORDINARY SKILL IN THE ART

36. I understand that the claims must be understood from the perspective of a POSITA at the time of the alleged inventions. I also understand that to determine the level of skill of a POSITA, one must consider several factors including the types of problems encountered in the art, the solutions to those problems, the rapidity with which innovations are made, the sophistication of the technology, and the education level of active workers in the field.

37. In my opinion, with respect to the '411 patent, a POSITA at the time of the alleged inventions would have had a bachelor's degree in computer science or a related field, plus at least two years of professional experience in the field of computer networks, wireless communications, or a similar field. This level of skill is approximate, and more experience would compensate for less formal education, and vice versa..

38. In my opinion, with respect to the '928 patent, a POSITA at the time of the alleged inventions would have had a bachelor's degree in electrical engineering, computer science or a related field, plus at least two to four years of professional experience in the field of relational databases and/or user interfaces thereto. This level of skill is approximate, and more experience would compensate for less formal education, and vice versa.

39. In my opinion, with respect to the '827 patent, a POSITA at the time of the alleged inventions would have had a bachelor's degree in electrical engineering, computer science, or a related field, plus at least two to four years of professional experience in the field of database and subscriber management. This level of skill is approximate, and more experience would compensate for less formal education, and vice versa.

40. In my opinion, with respect to the '493 patent, a POSITA at the time of the alleged inventions would have had a bachelor's degree in computer science or a related field, plus at least two years of professional experience in the field of telecommunication networks.

This level of skill is approximate, and more experience would compensate for less formal education, and vice versa.

41. In my opinion, with respect to the '819 patent, a POSITA at the time of the alleged inventions would have had a bachelor's degree in computer science or a related field, plus at least two years of professional experience in the field of web application development. This level of skill is approximate, and more experience would compensate for less formal education, and vice versa.

42. In my opinion, with respect to the '899 patent, a POSITA at the time of the alleged inventions would have had a bachelor's degree in computer science or a related field, plus at least two to four years of professional experience in the field of web application development and computer networking. This level of skill is approximate, and more experience would compensate for less formal education, and vice versa.

43. The level of skill in the art with respect to each patent is approximate, and more experience would compensate for less formal education, and vice versa.

44. I meet these criteria and consider myself a person with at least ordinary skill in the art pertaining to the asserted patents. I would have been such a person at the time of the invention of each of the asserted patents.

45. I applied this level of skill of a POSITA for purposes of my analysis in this Declaration. To my knowledge, neither Kaufman nor any of his experts have yet proposed an alternative level of skill of a POSITA. If and when they do, I reserve the right to provide further opinions concerning the appropriateness of that proposed level of skill of a POSITA, and to provide further opinions concerning any impact that the alternative level of skill of a person of ordinary skill would have on my analysis.

V. OVERVIEW OF THE PATENTS

A. The '411 Patent

46. The '411 Patent is directed to "systems and methods of providing content to a terminal having a limited display area for presenting such content. Ex. 411-1, 1:17–19. As described therein, mobile devices of the time (such as "internet-enabled mobile phones" and "PocketPC and palm-based computers") lacked the "storage capacity, memory, bandwidth, and [] large … display" required to download and display e-mail attachments (*e.g.* "normal application files–such as Powerpoint files, images, etc."). *Id.*, 1:58–65, 2:10–13, 2:17–19, 2:38–40. Instead, these devices of the time purportedly would "render [such content] in an extremely slow and/or inconvenient manner," *id.*, 9:44–45, for example, breaking up "large source documents into smaller parts because transmitting long documents at once over slow wireless networks can try the patience of users," *id.*, 2:40–43.

47. To solve this alleged problem, the '411 patent discloses systems and methods for reformatting mobile content, before delivery, into a well-known "vectorized" format (which were prevalent in the prior art at the time), such as Scalar Vector Graphics ("SVG"). *Id.*, 10:21–30. More particularly, to implement the described methods of delivering such reformatted content, the '411 patent further discloses use of a "messaging gateway" to deliver this reformatted content from a first network environment to an apparatus in a second network environment. *Id.*, 3:40–46. As shown in Figure 4 below, the messaging gateway is between the source in a first networking environment and the destination in s second networking environment. The messaging gateway receives, from the source, vectorized content intended for a mobile device, and then provides that content to the destination client for rendering and display. *Id.*, 10:12–34; 10:35–41.

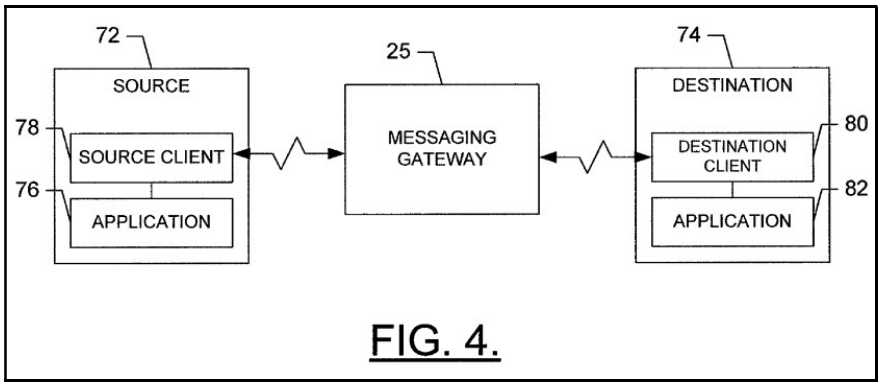


FIG. 4.

48. In addition to the reformatted content, a destination address of the mobile device for which the reformatted content is destined is sent to the messaging gateway. *Id.*, 10:55–63.

49. One observation that I make in connection with the '411 patent is that it is focused on old devices operating on slower networks. In particular, the '411 patent references first-generation, second-generation (including 2.5G), and third-generation mobile communication protocols:

> [I]t should be appreciated that the terminal 10 can be coupled to one or more of any of a number of different networks through the BS 14. In this regard, the network(s) can be capable of supporting communication in accordance with any one or more of a number of **first-generation (1G), second-generation (2G), 2.5G and/or third-generation (3G) mobile communication protocols** or the like. For example, one or more of the network(s) can be capable of supporting communication in accordance with 2G wireless communication protocols IS-136 (TDMA), GSM, and IS-95 (CDMA). Also, for example, one or more of the network(s) can be capable of supporting communication in accordance with 2.5G wireless communication protocols GPRS, Enhanced Data GSM Environment (EDGE), or the like. Further, for example, one or more of the network(s) can be capable of supporting communication in accordance with 3G wireless communication protocols such as Universal Mobile Telephone System (UMTS) network employing Wideband Code Division Multiple Access (WCDMA) radio access technology. Some narrow-band AMPS (NAMPS), as well as TACS, network(s) may also benefit from embodiments of the present invention, as should dual or higher mode mobile stations (e.g., digital/analog or TDMA/CDMA/analog phones). '411 patent at 6:24-47.

50. The typical download speeds of 2G, 2.5G, and 3G networks are exceedingly slow. For example, in a January 2004 press release announcing Verizon Wireless's national roll out of the 3G network, Verizon touted that the service "can deliver average user speeds of 300-500

kilobits per second (kbps)." *See* https://www.verizon.com/about/news/vzw/2004/01/pr2004-01-07. To put that into context, 500 kilobits is 0.0625 megabytes.

51. Another observation I make is that the reformatted visual content of the '411 patent is sent to mobile terminals, despite their limited display size and ability to render images, to augment voice calls.

52. The '411 patent is generally directed to "providing content to a terminal having a limited display area for presenting such content." *Id.*, 1:17–19. The '411 patent also describes that images and other value added content are created for rendering on "a large (typically at least 14-inch diagonal)" display. *Id.*, 2:9–13. On the other hand, the '411 patent describes that Internet-enabled mobiles phones can display only a few lines of text, and if they can render images, those images are rendered in grayscale or as thumbnail size images. *Id.*, 2:17–21.

53. The purpose of providing content to a mobile terminal is to "augment" voice calls. The '411 patent refers to "**the present solutions for augmenting voice calls** with images, data or other value added information." *Id.*, 1:66–2:1. The content is provided to mobile terminals "to augment verbal information and to improve the clarity and structure of the verbal communication." *Id.*, 1:28–30. In addition, "[t]o further illustrate the benefits of the present invention, consider the case of a 'rich call,' where shared content can be used to augment a cellular voice call." *Id.*, 18:42–44.

54. As described in the '411 patent, in a 2004 corporate office environment:

> Although, images, data or other value-added information can be readily shared on computers within the corporate network, this information is generally not accessible to users who are out of the office or do not have access to their personal computers. Typically, when an employee is away from the office, he can still communicate verbally using his mobile phone, but **he can not share any visual information with the calling party, which could otherwise be used to augment the voice call** and add value to the conversation. *Id.*, 1:38–46.

55. Lastly, I observe that at the time of filing of the ’411 patent, reformatting content into a vectorized format was well known. The ’411 patent refers specifically to the Scalable Vector Graphics (SVG) format which was developed by the World Wide Web Consortium (“W3C”). The first working draft of the SVG format was published in September 2001. *See* https://www.w3.org/TR/2001/REC-SVG-20010904/. Through to the time of filing of the ‘’411 patent, the SVG format had been through multiple iterations. *See*, *e.g.*, https://www.w3.org/TR/2003/REC-SVG11-20030114/. As noted by the ’411 patent, the SVG standard had matured to the point where special-purpose derivatives has already been developed: “the source client can reformat the content into a SVG (scalable vector graphics) format or any derivatives of the like (e.g., Mobile SVG, SVG-Tiny, SVG-Basic, etc.).” ’411 patent at 10:27-30. In particular, the W3C working draft of the Mobile SVG Profiles indicates that SVG Tiny “is defined to be suitable for cellphones” and SVG Basic “is suitable for PDAs.” *See* https://www.w3.org/TR/2004/WD-SVGMobile12-20040325.

56. Indeed, the use of vectorized formats to optimize display on mobile devices was well known. For example, during prosecution, the Examiner rejected the claims of the ’411 patent in view of US Patent No. 7,210,099 (“Rohrabaugh”). *See* Ex. 411-4 at 2–4 (’411 FH, April 20, 2011 Office Action). Rohrabaugh is directed to an “[a]pparatus and methods are provided for creating resolution-independent vector display of Internet content to allow it to be scaled (zoomed) larger and smaller for better viewing or to fit any resolution or screen size.” Rohrabaugh, Abstract. In response to this Office Action, the patent applicant attempted to argue that the claims were allowable over Rohrabaugh on grounds other than Rohrabaugh disclosing reformatting content into a vectorized format. *See* Ex. 411-5 at 7–9 (’411 FH, July 20, 2011

Applicant Remarks in Response to Office Action) (arguing that the content and addressing information are received from different network environments).

B. The '928 Patent

57. The '928 patent relates to a method for creating a multi-level enmeshed directory structure. Ex. 928-1, Abstract. In a "simple" or "conventional" directory structure, an object is associated with a unique descriptor (such as a filename contained in a directory), which can then be recursively associated with another higher-level descriptor. *Id.*, 1:31–34. Thus, a hierarchical descriptor structure is realized (such as a file system directory), wherein there is a unique chain of hierarchically ordered descriptors that lead to an object. *Id.*, 1:35–37. In particular, one can infer only one path by a descriptor traversal starting from the object itself. *Id.*, 1:39–41.

58. In contrast, the '928 patent purports to introduce a novel method for building hierarchies of descriptors. In what it refers to as a "multi-level enmeshed directory structure," multiple descriptors may describe a single data object, each descriptor may in turn also have multiple descriptors, and the descriptors may be linked to each other across multiple levels. The result is a multi-level interwoven mesh of descriptors creating many paths to any data object. *Id.*, 1:58–62.

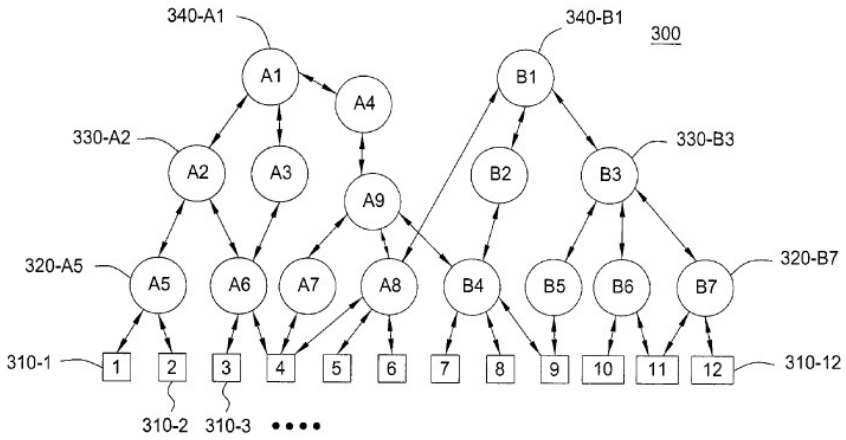


FIG. 3

59. As shown in Figure 3 above, the resultant enmeshed directory structure contains four levels. Each of a plurality of objects denoted as 310-1, 310-2 and so on up to 310-12 (collectively objects 310) is linked to one or more of eight descriptors (A5-A8; B4-B7) at a first hierarchical level, denoted as level 320. *Id.*, 4:59–62. Each of the descriptors at the first hierarchical leve1 320 is linked to one or more of six descriptors (A2-A4; B2-B3) at a second hierarchical level 330. *Id.*, 4:62–65. Each of the descriptors at the second article level 330 is linked to one or more of two descriptors (Al; B1) at a third hierarchical level 340. *Id.*, 4:65–67. Thus, a hierarchical descriptor structure is provided that can be used to describe objects in multiple ways. *Id.*, 5:8–10. Specifically, there are at least two paths to object 310-11 from descriptor B1. *Id.*, 5:10–11. They are: (1) 340-B1 → 330-B3 → 320-B6 → 310-11 and (2) 340-B1 → 330-B3 → 320-B7 → 310-11. *Id.*, 5:12–13.

C. The ’827 Patent

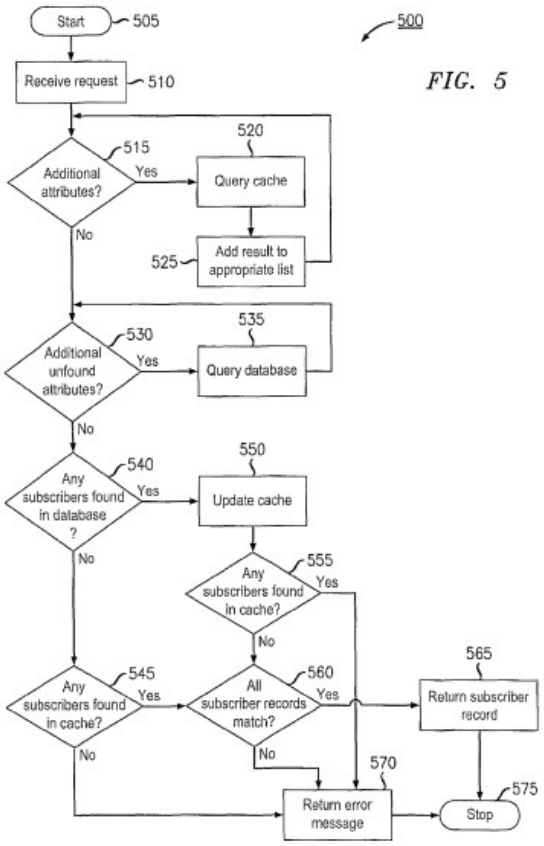
60. U.S. Patent No. 8,369,827 (“the ’827 patent”) is directed to managing a mobile telecommunications networks servicing multimedia demands built upon existing voice networks using a subscriber profile repository (“SPR”) in an LTE communications network. type of

management can be hard, combining new technology onto a legacy system. As such, and as noted in the specification, at the time of the '827 patent the 3rd Generation Partnership Project (3GPP) ha[d] recently promulgated "a new network scheme it term[ed] 'Long Term Evolution' (LTE)." Ex. 827-1, 1:29–32. "In an LTE network, all communications are carried over an IP [Internet Protocol] channel from user equipment (UE) [i.e., a mobile phone] to an all-IP core called the Evolved Packet Core (EPC)." *Id*. at 1:32–35. This EPC is of particular note as it facilitates managing subscriber control information in a legacy system by interfacing with the IP channel from user equipment. As specified in various 3GPP standards, this EPC core further included a component called an SPR. *See id*. at 1:38–45. The specifications further defined how the various elements of the EPC, including the SPR, "interact in order to provide reliable data services and charge subscribers for use thereof." *Id*. at 1:45–48.

61. The '827 patent notes purported issues with the implementation of the SPR, including, that the 3GPP specifications "do not specify the SPR's relation to any existing subscriber data base." *Id*. at 1:52–53. Accordingly, the '827 patent proposes a systems and methods to "quickly resolve requests" to the SPR. *Id*. at 1:58–61. The '827 patent proposed methods "performed by a Subscriber Profile Repository" for "determining a unique subscriber record from a set of subscription identifiers." The methods in particular involve a rudimentary search protocol to identify a unique subscriber record using a set of "subscription identifiers," including International Mobile Subscriber Identification (IMSI) number. *Id*. at Cl. 1.

62. This rudimentary search protocol is laid out in Figure 5. To determine a unique subscriber record, a request is received at the SPR via an SP interface. *Id*. at 8:46–52. The SP interface, simply the reference point between the SPR and PCRN, extracts subscriber identifiers and provides the identifiers to the SPR. *Id*. at 8:46–52, 9:14–22. Within the SPR, a search

manager subcomponent queries a subscriber database subcomponent within the SPR. *Id*. The search manager searches subscriber records that match the subscription identifiers provided by the SP interface. *Id*. Another SPR subcomponent, a results manager, then determines whether the "subscriber records in the list of found subscriber records consistently identify a unique subscriber record." *Id*. at 9:60–10:5. In other words the search manager looks for records matching a particular value, the identifier, and the results manager checks if the same record was identified each time.



D. The '493 Patent

63. U.S. Patent No. 9,088,493 (the "'493 patent") is generally directed to "retrieving timing information relating to usage by a user of one or more online services" in order to "determine[e] a pattern of consistent usage from the timing information," and based on this

information, "generat[e] scheduling information for transmission of a message based on the determined pattern." Ex. 493-1, 1:30-36; Abstract 1–6.

64. As described therein, online services (such as a shopping website, a social networking service, or a streaming music service) "have emerged as a key vehicle for commerce." *Id.*, 2:49–56. These online services "may find it beneficial to send a message to the user to convey an advertisement, a survey, or other information." However, the '493 patent notes that a key issue is the timing of these messages, *i.e.*, "[w]hen sending messages by an online service to a user, sending messages at the appropriate time of day would be more effective; that is, when the user is receptive to such information." *Id.*, 2:57–62. "During the scheduled appropriate time, the user is more likely to be amenable to receiving messages relating to the particular online services. By contrast, if the online service sends a message (e.g., text message) to a user late at night, the user may not available, and thus, the message is ineffective." *Id.,* 3:5–9; *see generally id.*, 3:5–30.

65. To address this issue, the '493 Patent discloses "an online service tracking platform … to determine appropriate times to send messages to users of one or more online services …." As further disclosed therein, "the appropriateness of the schedule or time can be based on whether the schedule is consistent with the user's use of the online services. A schedule is consistent with the user's use of the online service … if collected information about the user's usage is free from variation to a certain degree for a certain time window." *Id.*, 2:65–3:3.

E. The '819 Patent

66. The '819 patent relates to a method "for providing client-side caching in network communications." Ex. 819-1, '819 patent at Abstract. The '819 patent acknowledged that

client-side caching was already a well-known method of providing session persistence for network services, including for personalization and automatic user authentication. *Id.* at 1:9-13.

67. At the time of the purported invention, a common implementation of client-side caching involved caching scripting files with code setting session variables representing the connection state between the client and a server. *See id.* at 4:11-19. The '819 patent criticizes this use of scripting files for client-side caching as generally limited to providing "***static*** persistence information stored in global variables that cannot be changed or deleted." *Id.* at 4:12-14.

68. The '819 patent purports to improve the use of scripting files for client-side caching by making them updateable. *See id.* at 4:30-33. According to the claimed invention, these updates entail updating session variables on the server, and then sending the scripting file to the device. *Id.* at claim 1. And since session variables must be initialized before they can be updated, the '819 Patent discloses distinguishing between a "first time request" for a scripting file and subsequent requests. *See id.* ("if a request is a ***first time request***, [the server] collect[s] session configuration information . . . from the device [and] specifying session variables in the scripting file based on the session configuration information.") (emphasis added); *see also id.* at 5:12-18.

F. The '899 Patent

The '899 patent is directed to a system for interfacing web applications with packet-switched networks for text messaging. Ex. 899-1, '899 patent at Abstract; 1:1-3; 1:7-9; 1:53-58. The patent acknowledges that, at the time of the purported invention,

> there may be web-based applications that allow an end user to send or receive text messages. For example, an end user may access a 3rd party web site for sending/receiving text messages. Through the 3rd party web site, the end user may enter a message intended for a recipient and a telephone number for the recipient.

> The web-based application then generates a send request for the text message using an Application Programming Interface (API) defined for web-based services. In another example, some social networking services (e.g., Facebook) may provide text messaging capabilities through a web site. When a user logs into his/her social network account, one option available to the end user may be to send/receive text messages.

Id. at 1:25-39.

69. It further disclosed that the "RESTful web API" (Application Programming Interface) was a well-known standard API for web applications and that the Session Initiation Protocol (SIP) was one of many signaling protocols used in packet-switched networks. *See id.* at 1:40-46, 2:4-11, 3:29-33.

70. The Session Initiation Protocol was first defined in 1999 in Request for Comment (RFC) 2543 published by the Internet Engineering Task Force, and it was replaced by RFC 3261 in June 2002. *See* Exs. 899-2 ("SIP (Session Initiation Protocol)"); 899-3. Thus, the Session Initiation Protocol had been in use for more than a decade before the application to the '899 patent was filed in 2011 and was well-known to those of ordinary skill in the art.

71. RFC 3261 defines the Session Initiation Protocol, including its messaging format. *See* Ex. 899-3, § 7.0. It specifically defines two types of SIP messages, a SIP request and a SIP response. *See id.*, §§ 7.1-7.2. Although SIP requests and responses shared a basic format, the syntax of some of the message fields differ. *See id.*

72. The '899 patent asserts that an issue with RESTful APIs used for web services was that they do "not provide enough flexibility for today's evolving networks," including packet-switched networks. *Id.* at 1:47-49.

73. The purported solution presented by the '899 patent was a "conversion system" implemented between a web application and a packet-switched network. *See id.*, 3:6-33. The described system includes an "interface" configured to send and receive (i) RESTful operations

with a web application, and (ii) Session Initiation Protocol requests with a packet-switched network. *See id.*, 1:53-63; 3:29-39. The patent further describes the system also having a "controller" that converts SIP requests to RESTful operations and vice versa. *See id.*, 3:29-33, 39-42.

74. The '899 patent specification asserts that the conversion system receives a RESTful operation containing an SMS message from a web application, extracts the address data and the SMS message, and converts it into a "SIP MESSAGE" that encapsulates the SMS message. Ex. 819-1, 7:5-10, 59-61. Although the specification only uses the term "SIP MESSAGE" and not "SIP request," a POSITA would understand that the recited SIP MESSAGE is equivalent to the "SIP request" recited in the claims.

VI. DISPUTED CONSTRUCTIONS

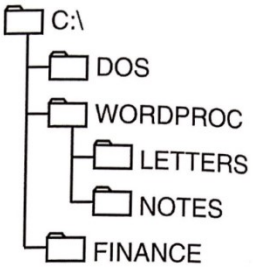
C. The '928 patent

1. "directory"

Salesforce's Proposed Construction	WSOU's Proposed Construction
"An entity in a file system which contains a group of files and/or other directories" (Claims 1, 13)	Plain and ordinary meaning

75. I agree with Salesforce that a "directory" means "an entity in a file system which contains a group of files and/or other directories." This definition is well understood to a POSITA. For example, the Dictionary of Computer and Internet Terms, Ex. 928-2, defines a directory as:

> **an area on a disk where the names and locations of files are stored**. **A disk can, and usually does, contain more than one directory, directories can contain other directories**.
>
> On the Macintosh and in Windows, **directories are called *folders***. Directories are pictures as tree structures or boxes within boxes (Figure 80).

> Directories are a way of classifying files; they do not divide the disk itself into sections. Any file can use as much space as needed, anywhere on the disk, regardless of what directory it is in.
>
> 
>
> FIGURE 80. Directories (shown graphically)

Similarly, The Facts on File Dictionary of Computer Science, Ex. 928-3, defines a directory as:

> **A FILE in a computer system containing a list of filenames**, their locations on BACKING STORE, and their size, as well as other information such as creation date, author, date of last access, and FILE PROTECTION code. **A computer system may have many directories, usually organized in a HIERARCHICAL FILE SYSTEM where directories can contain other directories (*subdirectories*) as well as data files**. On a MULTIACCESS SYSTEM each user normally has a directory, and possibly subdirectories, and there are one or more shared directories. Units of removable media (CDs, DVDs, floppy disks, etc.) each have their own directory. Directories are used by the operating system to locate files when given their names, and by computer users to keep track of what files are available. ***See also* folder.**

76. In addition, the definition chosen by the patentee for directory comports with these definitions. In the specification, the patentee defined a directory as "an entity in a file system, which contains a group of files and/or other directories." *See* '928 patent at 1:25–27.

77. For these reasons, in my opinion, Salesforce's construction for the term "directory" is correct and would be understood by a POSITA in this way.

2. "identifying a single initial descriptor that links a plurality of descriptors and two or more predecessor descriptors linking another single descriptor"

Salesforce's Proposed Construction	WSOU's Proposed Construction

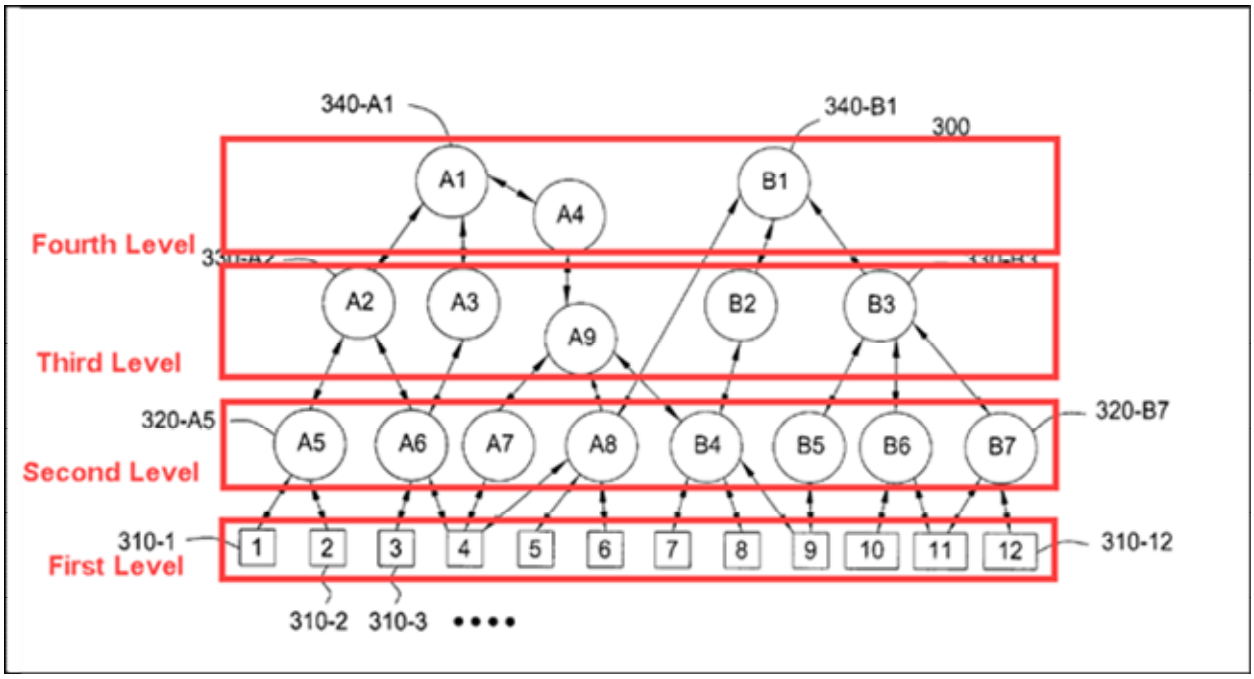
"identifying a single initial descriptor in a first level of the hierarchy, the single initial descriptor linked to a plurality of descriptors in a second level of the hierarchy, the plurality of descriptors linked to two or more predecessor descriptors in a third level of the hierarchy, and the two or more predecessor descriptors linked to another single initial descriptor that is in a fourth level of the hierarchy"	Plain and ordinary meaning

78. In my opinion, this term has a particular, technical meaning in the context of the '928 patent as evidenced by the specification and prosecution history. In my opinion, a POSITA at the time of the invention reading the specification and prosecution history would understand this limitation consistent with Salesforce's construction.

79. I first note that there are four different types of descriptors in this limitation: a "single initial descriptor," "a plurality of descriptors," "two or more predecessor descriptors," and "another single descriptor." As described above in the patent background, the '928 patent is directed to a multi-level enmeshed directory structure. As also described above, in my opinion (which is corroborated by the specification), a POSITA would understand the directories of the directory structure to be entities in a file system that contain a group of files and/or other directories. A POSITA would naturally understand that the multi-level hierarchical structure includes different levels of directories and subdirectories. In particular, if a directory is linked to a directory in a hierarchical level above that directory, it is a subdirectory of the directory to which it is linked.

80. The "single initial descriptor" is therefore on a first level of the hierarchy, which corresponds with the "initial data objects" 310-1 through 310-12. The "plurality of descriptors" are on a second level of the hierarchy, the "two or more predecessor descriptors" are on a third level of the hierarchy, and the "another single descriptor" are on a fourth level of the hierarchy.

Below I have annotated FIG. 3 with how I believe a POSITA would understand the four levels of the hierarchy which is in accord with the patent applicant's identification of the four levels of the hierarchy as set forth in paragraph 84 below.



81. In addition, the specification specifically refers to these four levels of the hierarchy. *See* '928 patent at 4:57-67:

> FIG. 3 graphically depicts an Enmeshed Directory Structure of a file system according to one embodiment. Specifically, each of a plurality of objects denoted as 310-1, 310-2 and so on up to 310-12 (collectively objects 310) is linked to one or more of eight descriptors (A5-A8; B4-B7) **at a first hierarchical level, denoted as level 320**. Each of the descriptors at the first hierarchical level 320 is linked to one or more of six descriptors (A2-A4; B2-B3) **at a second hierarchical level 330**. Each of the descriptors at the second article level 330 is linked to one or more of two descriptors (A1; B1) **at a third hierarchical level 340**.

82. Note that, in addition to what the specification refers to as the first, second, and third hierarchical levels, the specification also refers to a level of objects (level 310). A POSITA would understand that this level of objects is the first level of the hierarchy and the described

first, second, and third levels in the specification are actually the second, third, and fourth levels, which the patent applicant confirmed during prosecution.

83. In fact, in response to a non-final rejection and to overcome prior art, the applicant amended claims 1 and 13 to include the limitation at issue and the fourth level of the hierarchy. *See* Ex. 928-4 at 9 ('928 FH, November 23, 2011 Applicant Amendment). The applicant then argued that the prior art at issue did not meet this limitation, but the Examiner found these arguments unpersuasive. *See* Ex. 928-5 at 3–4 ('928 FH, January 11, 2012 Final Rejection).

84. The applicant then filed an appeal brief in which applicant expressly characterized this limitation, argued that:

> ***As claimed***, ***there are at least four levels to the hierarchy***; namely, ([level] 1) an initial descriptor (e.g., 310-1 through 310-12) that ([level] 2) links a plurality of descriptors (e.g., A5, A6, A7, A8, B4, B5, B6 and B7) and ([level] 3) two or more predecessor descriptors (e.g., A2, A3, A9, B2 and B3) linking ([level] 4) another single descriptor (e.g., A1, A4, B1).

Ex. 928-6 at 13 ('928 FH, March 14, 2012 Appeal Brief) (emphasis added).

85. Accordingly, in my opinion a POSITA would understand that the prosecution history expressly requires, based on applicant's characterization of the claim in an attempt to overcome the prior art, that the claimed structure as reflected in this limitation consist of four hierarchical levels wherein the "initial descriptor" (e.g., one of 310-1 through 310-12) is at the first level; the "initial descriptor" is linked to a "plurality of descriptors" (e.g., two or more of A5, A6, A7, A8, B4, B5, B6, and B7) at the second level; the "plurality of descriptors" are linked to "two or more predecessor descriptors" (e.g., A2, A3, A9, B2, and B3) at the third level; and the "plurality of descriptors" are linked to "another single descriptor" at the fourth level (e.g., A1, A4, B1).

D. The '827 patent

1. "Subscriber Profile Repository (SPR)" (Claim 1, 14)

86. In my opinion, the term "Subscriber Profile Repository (SPR)" has a particular, technical meaning in the context of the '827 patent as evidenced by intrinsic and extrinsic evidence. In my opinion, a POSITA at the time of the invention reading the relevant intrinsic evidence would interpret the claim term "Subscriber Profile Repository (SPR)" consistent with Salesforce's construction, "a logical entity containing all subscriber/subscription related information needed for subscription-based policies and Policy and Charging Control rules as defined by the 3GPP standard." Moreover, a skilled artisan would interpret this term in this manner in light of extrinsic evidence, which further confirms Salesforces's construction.

87. A POSITA, reading the intrinsic evidence, would understand that "Subscriber Profile Repository (SPR)" stores subscriber information for Policy and Charging Control rules under the 3GPP specifications. The specification explains "PCC[(Policy and Charging Control)] rule creation [is] based on information contained in the SPR such as, for example, subscriber and service related data." Ex. 827-1, 1:50–52. To accomplish this rule creation the SPR communicates with a Policy and charging rules node (PCRN) "via the Sp interface when creating PCC rules" and the SPR is used "to obtain subscriber service data or to coordinate messages from multiple sources." *Id*., 4:15–26. The PCRN and SPR would be disposed in an Evolved Packet Core according to the 3GPP specifications. *Id*., 3:44–54, Fig. 1.

88. A POSITA, reading the intrinsic evidence, would understand that a Subscriber Profile Repository (SPR) refers to the Subscriber Profile Repository described and defined in the 3GPP specifications. First, the claims refer to an exact expression of the term, including both capitalization of the first letter in each of **S**ubscriber **P**rofile and **R**epository followed by the acronym SPR. A POSITA would understand both of these factors to necessarily refer to a term

with a particular, technical definition. For example, this is likewise done with other well-known standard terms like "'**L**ong **T**erm **E**volution' (LTE)" and "**I**nternet **P**rotocol (IP)." *Id*., 1:25, 1:32 (Emphasis added). In light of the very "Background" of the invention section explaining "3GPP TS 29.212, 29.213, and 29.214 specifications provide some guidance on PCC rule creation based on information contained in the *SPR,*" a POSITA would understand SPR to be defined by the 3GPP specifications here. *Id.*, 1:49–51.

89. A POSITA reading the intrinsic record would be familiar the 3GPP specifications. The 3GPP, "the 3rd Generation Partnership Project (3GPP)," provided "a new network scheme it term[ed] 'Long Term Evolution' (LTE)." *Id*., 1:29–31. Primarily, the '827 Patent draws from the 3GPP specifications "an all-IP core called the Evolved Packet Core (EPC) [which] . . .provides gateway access to other networks while ensuring an acceptable QoE and charging a subscriber for their particular network activity." *Id*., 1:31–36. The EPC helps alleviate some key issues with "povid[ing] expanded functionality . . . [on] a system designed simply for voice communication." *Id*. 1:15–17. In my opinion this is a key goal of the patent.

90. The 3GPP specifications provide an express definition of Subscriber Profile Repository. The 3GPP TS 23.203 standard provides "[t]he SPR logical entity contains all subscriber/subscription related information needed for subscription-based policies and IP-CAN bearer level PCC rules by the PCRF." Ex. 827-2 at § 6.2.4. As discussed above, this definition aligns the '827 Patent's discussion of the SPR and PCRN. The '827 Patent even explains how the SPR may be implemented in the same way as the 3GPP specifications. *Compare* Ex. 827-1, 4:43-44 ("SPR [] may also be distributed across a network") to Ex. 827-2 at § 6.2.4("The SPR may be combined with or distributed across other databases in the operator's network"). Beyond borrowing language from the 3GPP specifications, the '827 Patent also borrows from the figures

found in the 3GPP standard. For example the annotated figures below use the same symbol for SPR and provide the same disposition of the same components. *Compare* Ex. 827-1, Fig. 1 *with* Ex. 827-4, Fig. 4.3. In my opinion, a POSITA, seeing the identical figure, similar instructions for implementation of the SPR, and the same purpose of the SPR and PCRN system, would understand SPR according to the 3GPP specifications.

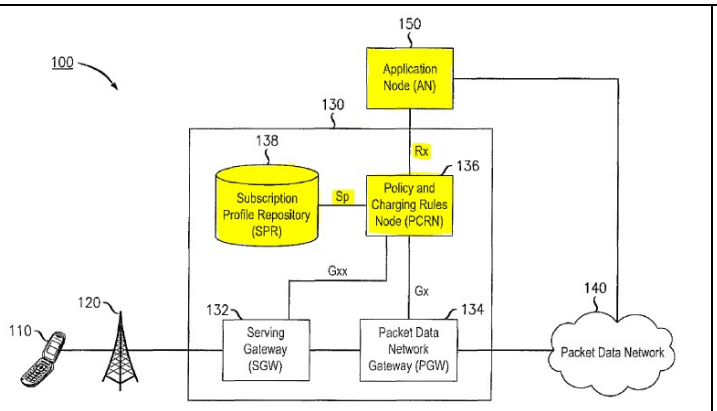


FIG. 1

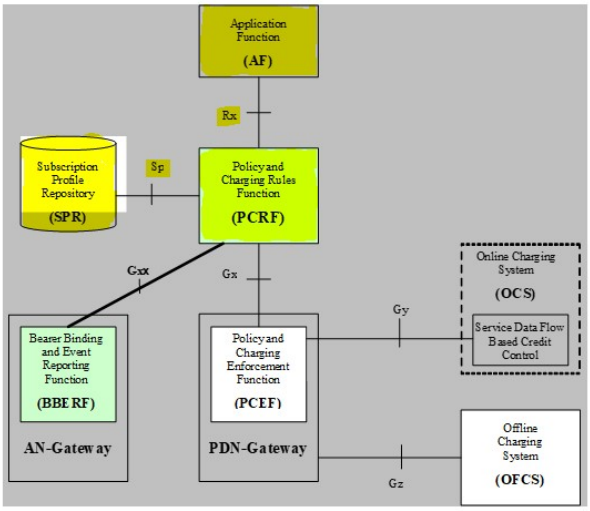


Figure 4a.2.1: Gxx reference point at the Policy and Charging Control (PCC) architecture

91. A POSITA would view Salesforce's constructions as accurate in view of extrinsic evidence. For example, the 2013[3] EPC and 4G Packet Networks, Ex. 827-3, describes creating 3G, 4G, and LTE networks and managing data traffic. In particular, it provides "[t]he Subscriber Profile Repository (SPR) is the database that was originally defined to hold subscription data for the PCC framework." Ex. 827-3 at 276.

92. Moreover, in my opinion a POSITA would understand the claimed invention to require a Subscriber Profile Repository (SPR) specifically. A POSITA would understand a SPR to have specific functionality different from other databases including those used previously. Before the 3GPP introduced SPR and LTE, on 3G networks "the Home Location Register (HLR)

[3] The first edition of this book was published in 2009 and in my opinion, the second edition, cited here, reflects the understand of a POSITA at the time of the patent would have.

was the main subscriber database." Ex. 827-3 at 272, *see also* Ex. 827-6 at § 3.2. The HLR was accessed by a different SWx interface while the SPR used a SP interface and was not able to support roaming between operators with different deployments of a HLR. Ex. 827-3 at 272-3, 277. In contrast the SPR was introduced in 4G to manage Policy Charge and Control rules no relevant with the greater bandwidth and was not used in 3G networks where the rules were less necessary. In this way, the SPR was introduced to serve a different purpose. *Id.* at 276 ("Compared to the HSS, the SPR stores the more dynamic business rules that are needed for PCC, while the HSS contains the more static subscription data needed for network access."); *see also* Ex. 827-5 at §§ 4.1.1.1, 4a.20 ("The HSS is the master database for a given user. It is the entity containing the subscription-related information to support the network entities actually handling call/sessions." "The SPR logical entity contains all subscriber/subscription related information needed for subscription-based policies and charging control by the PCRF.") A single system might have both a HLR and a SPR, used for different purposes. Ex. 827-6 at Fig. 8.1.

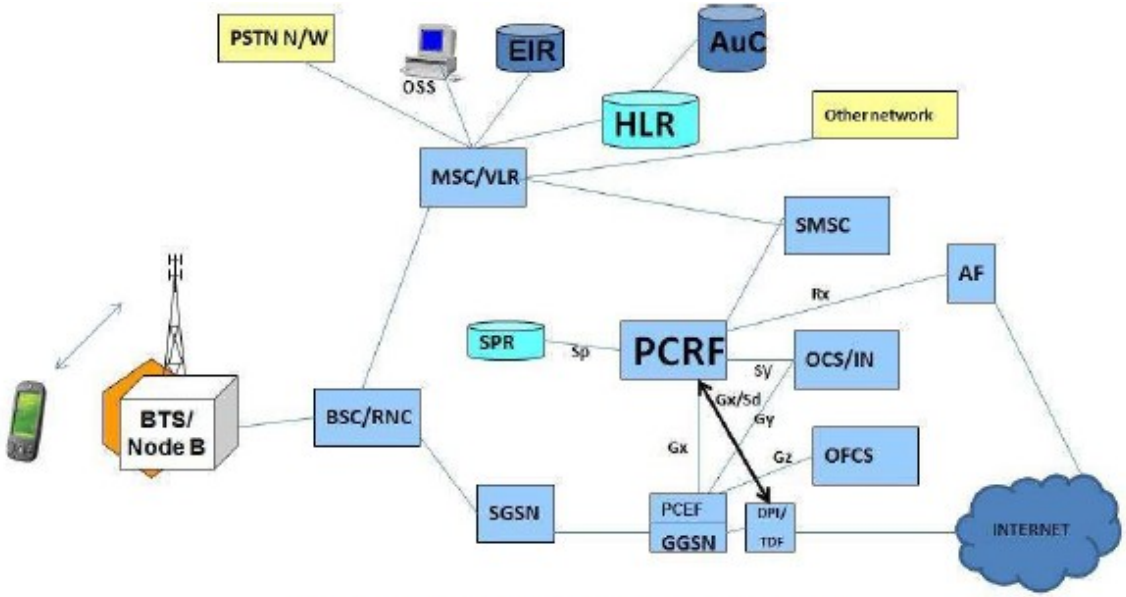


Figure 8.1: PCRF with 2G/3G Network

E. The '493 patent

1. "[A] login of the user with one of the one or more online services" (Claims 1, 5)

Salesforce's Proposed Construction	WSOU's Proposed Construction
"an entering of user information in order to access an online service"	Plain and ordinary meaning

93. In my opinion, the claim limitation that uses the term "a login of the user with one of the one or more online services" in the '493 patent would be understood by a POSITA as "an entering of user information in order to access an online service."

94. Claims 1 and 5 of the '493 patent use the term "a login of the user with one of the one or more online services" as associated with timing information relating to usage by the user, as shown below:

> Ex. 493-1, claim 1: "1. A method comprising:
>
> receiving a request from at least one of one or more online services to transmit a message to a user of the one or more online services;
>
> collecting timing information relating to usage by the user from a platform configured to provide the one or more online services, wherein the timing information is associated with ***a login of the user with one of the one or more online services***;
>
> determining, by a processor, a pattern of consistent usage from the timing information, wherein the pattern reflects usage of at least one of the one or more online services and transmission availability of a message; and
>
> generating scheduling information for transmission of the message to the user, ***based on*** the determined pattern of consistent usage and a consistency of the determined pattern of consistent usage, wherein the message is associated with the one or more online services."
>
> *Id.*, claim 5: "5. An apparatus comprising:
>
> at least one processor; and
>
> at least one memory including computer program code,
>
> the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to perform at least the following,
>
> > receive a request from at least one of one or more online services to transmit a message to a user of the one or more online services;

> collect timing information relating to usage by the user from a platform configured to provide the one or more online services, wherein the timing information is associated with ***a login of the user with one of the one or more online services***;
>
> determine a pattern of consistent usage from the timing information, wherein the pattern reflects usage of at least one of the one or more online services and transmission availability of a message; and
>
> generate scheduling information for transmission of the message to the user, based on the determined pattern of consistent usage and a consistency of the determined pattern of consistent usage, wherein the message is associated with one or more online services."

95. The claim term "login" has a well understood meaning of the initiating process by which a user first "identifies herself or himself to a system" to gain access to a particular service. Ex. 493-2.

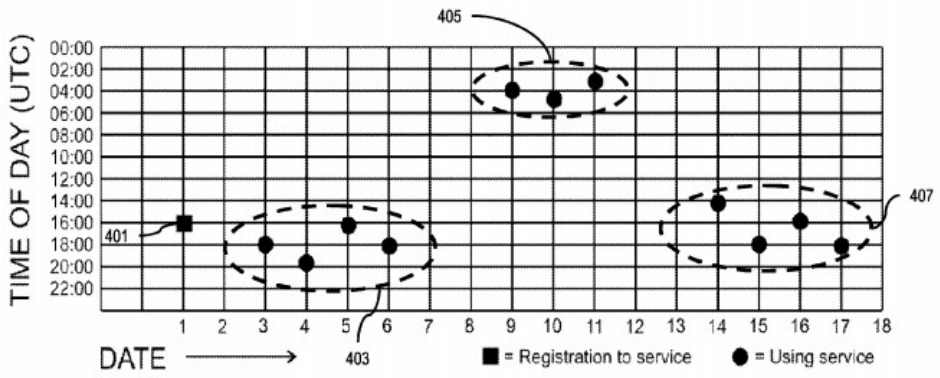
96. As recited in the claims, each login to an online service must be associated with user information. More particularly, independent claims 1 and 5 require "collecting timing information relating to usage by the user." Ex. 493-1, cls. 1 & 5. This timing information "is associated with a login of the user with one of the one or more online services." *Id.* Accordingly, (1) the claims require an association of timing information with a particular login by a particular user, and (2) the timing information is collected based on the user's use of one particular service of the one or more online services corresponding to that login.

97. The specification makes clear that a login is a process, separate from and takes place after registration, by which the user is authenticated with a particular online service to gain access to the service. More particularly, as described in the specification in the context of service interface module 201, a login is the process of authenticating a user to use a particular online service: "the service interface module 201 can be used to authenticate a user with the online service 103." Ex. 493-1, 7:20–22 *see generally id.*, 7:12–35 ("[O]nce registration is complete, the runtime module 207 ***can allow the user access to the online service 103 once the***

user authenticates with the online service 103 via the service interface module 201."). As a POSITA would readily understand, such authentication requires some entry of user information into the system for the purpose of authentication.

98. Moreover, each login is associated with a particular access to an online service after registration. For example, as explained in the context of Fig. 4, the registration of the user with the service takes place at a particular time, designated by data point 401 below. After this initial registration process, each time the logs into the system, the timing of that login is recorded, as reflected by data points "403, 405, 407 [which] ***represent the login times of the user*** on the corresponding days."). Ex. 493-1, 12:34–40.

FIG. 4



2. "determining … a pattern of consistent usage from the timing information" (Claims 1, 5) and "a consistency of the determined pattern of consistent usage" (Claims 1, 5)

Salesforce's Proposed Construction	WSOU's Proposed Construction

"determining … a pattern of consistent usage from the timing information" Indefinite, or, in the alternative, "determining, based on applying a set of predefined rules to the timing information, that the user's usage of an online service is free from variation to a certain degree for a certain time window"	Plain and ordinary meaning
"a consistency of the determined pattern of consistent usage" Indefinite, or, in the alternative, "the extent to which the previously determined pattern of consistent usage is within a certain tolerance range or time window based on the predefined rules applied to the timing information"	Plain and ordinary meaning

99. Claims 1 and 5 of the '493 patent use the terms ""determining … a pattern of consistent usage from the timing information" and "a consistency of the determined pattern of consistent usage" as basis to "generate scheduling information for transmission of the message to the user," as shown below:

Ex. 493-1, claim 1: "1. A method comprising:

> receiving a request from at least one of one or more online services to transmit a message to a user of the one or more online services;
>
> collecting timing information relating to usage by the user from a platform configured to provide the one or more online services, wherein the timing information is associated with a login of the user with one of the one or more online services;
>
> determining, by a processor, a pattern of consistent usage from the timing information, wherein the pattern reflects usage of at least one of the one or more online services and transmission availability of a message; and
>
> generating scheduling information for transmission of the message to the user, ***based on the determined pattern of consistent usage and a consistency of the determined pattern***

of consistent usage, wherein the message is associated with the one or more online services."

Ex. 493-1, claim 5: "5. An apparatus comprising:

at least one processor; and

at least one memory including computer program code,

the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to perform at least the following,

receive a request from at least one of one or more online services to transmit a message to a user of the one or more online services;

collect timing information relating to usage by the user from a platform configured to provide the one or more online services, wherein the timing information is associated with a login of the user with one of the one or more online services;

determine a pattern of consistent usage from the timing information, wherein the pattern reflects usage of at least one of the one or more online services and transmission availability of a message; and

generate scheduling information for transmission of the message to the user, ***based on the determined pattern of consistent usage and a consistency of the determined pattern of consistent usage***, wherein the message is associated with one or more online services."

100. The specification describes these limitations as:

a. "A schedule is consistent with the user's use of the online service, in some embodiments, if collected information about the user's usage is free from variation to a certain degree for a certain time window." Ex. 493-1, 3:1–5.

b. "The online service tracking platform 102 can additionally determine if the timing information is consistent according to a consistency rule before utilizing the timing information for the determination. In certain embodiments, consistency rules can be based on the amount of variation in timing information over a certain period of time. For example, the user can have a usage pattern associated with the online service 103 that indicates that the user uses

the online service 103 between 16:00 Coordinated Universal Time (UTC) and 18:00 UTC on weekdays, however, in the past two weekdays; the pattern has shifted to the user accessing the online service 103 between 2:00 UTC and 4:00 UTC. Because the pattern has shifted from one use time period pattern to another use time period pattern, the information may be inconsistent. Under one scenario, the consistency rule requires that a time period pattern must be consistent for at least three consecutive uses and the time period pattern must encompass less than a 4 hour time period. The current pattern meets the 4 hour time period portion of the rule, however fails the three consecutive uses portion of the rule. Thus, the online service tracking platform 102 may choose to postpone scheduling of the sending of the instant message until more data is collected. Alternatively, the consistency rule can require that a time period pattern must be consistent for at least two consecutive uses and the time period pattern must encompass less than a 3 hour time period. Under this scenario, the user's usage patterns meet the consistency rule and the message can be sent at the appropriate time." Ex. 493-1, 4:45–5:5.

c. "The pattern of consistent usage reflects use by the user based on certain rules. The rules can be based on the recentness of the data points, the consistency of the data points, or other criteria that reflect when a user is using the online service 103. For example, the determined pattern can be based on the number of times the user uses an online service 103 during a certain time window on multiple consecutive days." Ex. 493-1, 9:1–8.

d. "The scheduling information can also be determined based on other factors such as the consistency of the pattern. Generating of scheduling information can be based on criteria. For example, generating scheduling information may be based on a set of criteria that requires that the determined pattern be consistent for at least a certain period of time. Thus, if a pattern is not consistent for the requisite time, the runtime module 207 can determine to postpone

sending of the message until more consistent data is collected. Another criterion could be that if there is more than one available pattern, to select whichever pattern yields the soonest transmission time or select whichever pattern has the highest consistency level." Ex. 493-1, 9:13–25.

e. "A consistency rule can be based on the lack of variance in data point time values over a period of time. An exemplary consistency rule may require that a pattern is consistent (e.g., within a certain tolerance range or time window) over at least three consecutive usage days of the group. Another exemplary consistency rule may require that a pattern be consistent over at least three out of the four user usages within the group. In another example, the consistency rule can output a how many days of recent use the user used the service within a time window and output how many days were outside of the time window. Additionally, the runtime module 207 can determine a consistency level of a data pattern. The consistency level can be determined by statistics based on a correlation of historical data in combination with the recent usage pattern. Further, the consistency level can be greater (e.g., more accurate) with more consistent data." Ex. 493-1, 11:44–62.

101. The term "a pattern of consistent usage" in this limitation is an indefinite term of degree as it fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention.

102. The term "pattern of consistent usage" does not have a well understood meaning to a POSITA. Accordingly, a POSITA must consider the disclosure of the intrinsic record to derive its meaning.

103. In reviewing the intrinsic evidence, including the only disclosures in the specification as to this claim term, it is clear to me that the term "consistent" in and of itself, as

well as the '493 patent's teachings related thereto, inherently involve terms of degree. However, the '493 patent fails to provide sufficient objective boundaries by which a POSITA can determine the scope of this claim limitation.

104. The claims themselves say nothing about what "consistent" or "consistency" means; rather, they only state that a pattern of consistent usage is "determine[ed]," and that the "scheduling information for transmission of the message to the user" is based in part on the "determined pattern of consistent usage."

105. The specification expressly defines a pattern of consistent usage as being a term of "degree," i.e., the specification states that the pattern of consistent used is based on applying a set of [unspecified,] predefined rules to the timing information, that the user's usage of an online service is free from variation to a certain degree for a certain time window." *See* Ex. 493-1, 3:1–5; *see also id*., 4:48–50 ("consistency rules can be based on the amount of variation in timing information over a certain period of time"), 11:46–48 ("A consistency rule can be based on the lack of variance in data point time values over a period of time"). While the specification does disclose examples of what may reflect a pattern of consistent usage, *id*. at 4:56–5:5; 11:48-50, the specification fails to provide sufficient guidance to a POSITA as to what may be *objective* boundaries for an acceptable freedom of variation for what degree for what time period, and instead speaks only in terms of generalities and leaves the requisite level of freedom of variation to the implementer.

106. Standard dictionary definitions, to the extent relevant, also lend no assistance to a POSITA, and instead only highlight the personal subjectivity of what constitutes "consistent" and/or "consistency." For example, dictionaries define "consistent" as "in agreement or harmony, in accord; compatible" or "holding always to the same principles or practice,"

Ex. 493-3, or "holding to the same principles" or "in agreement," Ex. 493-4. Dictionaries similarly define "consistency," as "agreement; harmony; logical connection" or "agreement with what has already been done or expressed; conformity with previous practice," Ex. 493-3 and "being consistent," Ex. 493-4. These definitions show that these are terms of degree with no objectively defined bounds.

107. In the alternative, if "consistent" is not indefinite regardless of the fact that it is a term of degree without specific boundaries in the specification, then the "determining … a pattern of consistent usage from the timing information" limitation should at the least be defined in accordance with the disclosure in the specification, which is the only guidance as to the meaning of this term for a POSITA.

108. The '493 specification states that a schedule of when to transmit a message to the user is consistent when it is based on "collected information about the user's usage [that] is free from variation to a certain degree for a certain time window." Ex. 493-1, 3:1–5, 11:46–48. For example, the mechanism disclosed in the specification for determining whether a pattern of usage is "consistent" is through application of a set of "consistency rules," or "a set of predefined rules" to the timing information, which can be "based on the recentness of the data points, the consistency of the data points, or other criteria that reflect when a user is using the online service." *Id*., 9:1–8, 11:48–56.

109. In my opinion, for substantially the same reasons as set forth with respect to "pattern of consistent usage," the claim limitation that uses the term "a consistency of the determined pattern of consistent usage" in the '493 patent is indefinite. A POSITA would not be able to understand the scope of those claim limitations.

110. The claims themselves again provide no guidance as to what a "consistency" of a "pattern of consistent usage" is, much less how to determine the boundaries of whether a given pattern of consistent usage has sufficient "consistency." Rather, the claims only states that the scheduling information is generated not only based on a determined pattern of consistent usage, but further, on the "consistency" of that determined pattern of consistent usage.

111. Similarly, the specification further describes "a consistency of the determined pattern of consistent usage" in terms of "***a***[n unspecified] ***set of criteria*** that requires that the determined pattern ***be consistent for at least a certain period*** of time." Ex. 493-1, 9:13-25 (emphasis added).

112. The specification further states that "[t]he consistency level can be determined by statistics based on a correlation of historical data in combination with the recent usage pattern" and that this "level can be greater (e.g., more accurate) with more consistent data," but again fails to provide sufficient guidance to a POSITA as to the objective boundaries as to what level of consistency the pattern of consistent usage must have for what "certain period of time," "tolerance range," or "time window." *See* Ex. 493-1, 11:44–62.

113. In the alternative, if "a consistency of the determined pattern of consistent usage" limitation is not indefinite regardless of the fact that it is a term of degree without specific boundaries, then this limitation should be defined as "the extent to which the pattern of consistent usage is within a certain tolerance range or time window based on the predefined rules applied to the timing information," which is the only guidance for a POSITA as to the meaning of this term. *See* Ex. 493-1, 4:48–58, 9:13–25, 11:56–62.

F. The '819 patent

1. "scripting file"

Salesforce's Proposed Construction	WSOU's Proposed Construction

"file written in a scripting language that is interpreted at runtime instead of being compiled into machine language instructions"	Plain and ordinary meaning.

114. In my opinion, a POSITA at the time of the alleged invention described in the '819 patent would have understood the term "scripting file" to mean a "file written in a scripting language that is interpreted at runtime instead of being compiled into machine language instructions."

115. This definition of "scripting file" is supported by both the intrinsic record and the extrinsic evidence. As an initial matter, a POSITA would have understood that the term "scripting" refers to the use of a scripting language to program or instruct computers. This understanding is consistent with the '819 patent's disclosure that one form of client-side caching "is based on scripting languages (e.g., Javascript)," and that its "described approach imposes no restrictions on the session variables meaning that the variables can even be functions of a programming language (e.g., Javascript)." *See* Ex. 819-1, '819 patent at 4:11-12, 14:54-56; *see also id.* at 14:56-59 ("Basing the session variables on a scripting language advantageously enables the scripting file to support a greater variety and quantity of client-side consistency functions."). The extrinsic evidence also supports this understanding. *See* Ex. 819-2, Webster's New World Telecom Dictionary (2008) ("scripting").

116. A POSITA would further recognize that the term "scripting languages" in the '819 patent have a well-established meaning in the field of computer science: programming languages that are interpreted at runtime and not compiled into machine code. The intrinsic and extrinsic evidence both support this understanding. As noted above, within the '819 patent specification, the JavaScript scripting language is also referred to as a "programming language." Furthermore, at least one contemporaneous technical encyclopedia taught that "scripting

languages are interpreted, not compiled." Ex. 819-3, Encyclopedia of Computer Science and Technology (Revised Edition) (2009) ("scripting languages").

G. The '899 patent

1. "SIP request"

Salesforce's Proposed Construction	WSOU's Proposed Construction
"a message conforming to the request message format of the Session Initiation Protocol specification as set forth in RFC 3261 published by the Internet Engineering Task Force"	Plain and ordinary meaning.

117. In my opinion, a POSITA at the time of the alleged invention described in the '899 patent would have understood the term "SIP request" to mean "a message conforming to the request message format of the Session Initiation Protocol specification as set forth in RFC 3261 published by the Internet Engineering Task Force."

118. This definition of "SIP request" is supported by both the intrinsic record and the extrinsic evidence. As an initial matter, the '899 patent discloses that the acronym "SIP" refers to the Session Initiation Protocol. Ex. 899-1, '899 patent at 2:29-33. In addition, a POSITA would recognize that the Session Initiation Protocol was a well-known network signaling protocol with a specification published by the Internet Engineering Task Force (IETF). Indeed, a contemporaneous technical dictionary taught that "[t]he IETF defined SIP in RFC 2543 (1999), which was replaced by RFC 3261 (2002)." Ex. 899-2, Webster's New World Telecom Dictionary (2008) ("SIP (Session Initiation Protocol)"). Furthermore, the Session Initiation Protocol specification taught that a SIP request is a type of SIP message with its own format and set of data fields. *See* Ex. 899-3, RFC 3261 – SIP: Session Initiation Protocol (June 2002) § 7.1 ("Requests").

2. "RESTful"

Salesforce's Proposed Construction	WSOU's Proposed Construction
"conforming to the Representational State Transfer (REST) architectural style consisting of architectural elements and a set of constraints applied to the elements of the architecture"	Plain and ordinary meaning.

119. In my opinion, a POSITA at the time of the alleged invention described in the '899 patent would have understood the term "RESTful" to mean "conforming to the Representational State Transfer (REST) architectural style consisting of architectural elements and a set of constraints applied to the elements of the architecture."

120. This definition of "RESTful" is supported by both the intrinsic record and the extrinsic evidence. As an initial matter, the '899 patent discloses that the acronym "REST" refers to "Representational State Transfer." Ex. 899-1, '899 patent at 1:45-56. Furthermore, during the prosecution of the '899 patent, in response to the examiner's objection to the term "RESTful," the patentee acknowledged that "RESTful is based on the Representational State Transfer architecture." Ex. 899-4, '899 Patent File History – April 25, 2013 Office Action Response at 7.

121. A POSITA would know that the Representational State Transfer (REST) architecture was defined by Roy Thomas Fielding as part of his Ph.D. dissertation. *See* Ex. 899-5, Roy Thomas Fielding, "Dissertation: Architectural Styles and the Design of Network-based Software Architectures" (2000), Chapter 5 ("Representational Transfer State (REST)"). In his dissertation, Fielding "introduces and elaborates the Representational State Transfer (REST) architectural style," explaining that an "architecture can be described by an architectural style consisting of the set of constraints applied to elements within the architecture." *Id.* at 76.

I declare under penalty of perjury that the foregoing is true and correct. Executed in Franklin, TN on October 6, 2021.

Dr. Douglas C. Schmidt